



Carbon cone and carbon whisker field emitters

Description of Technology: Carbon cone and carbon whisker field emitters are disclosed. These field emitters find particular usefulness in field emitter cathodes and display panels utilizing said cathodes. The carbon cone and carbon whisker field emitters can be formed by ion beam bombardment (e.g., ion beam etching) of carbon materials (e.g., bulk carbon, carbon films or carbon fibers).

Patent Listing:

1. **US Patent No. 6,020,677**, Issued on February 1, 2000, “Carbon cone and carbon whisker field emitters”

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,020,677.PN.&OS=PN/6,020,677&RS=PN/6,020,677>

Market Potential: Field emission electron sources, often referred to as field emission materials or field emitters, can be used in a variety of electronic applications, e.g., vacuum electronic devices, flat panel computer and television displays, emission gate amplifiers, and klystrons and in lighting.

Display panels are used in a wide variety of applications such as home and commercial televisions, laptop and desktop computers and indoor and outdoor advertising and information presentations. Flat panel displays are only a few inches thick in contrast to the deep cathode ray tube monitors found on most televisions and desktop computers. Flat panel displays are a necessity for laptop computers, but also provide advantages in weight and size for many of the other applications. Currently laptop computer flat panel displays use liquid crystals which can be switched from a transparent state to an opaque one by the application of small electrical signals. It is difficult to reliably produce these displays in sizes larger than that suitable for laptop computers.

Plasma displays have been proposed as an alternative to liquid crystal displays. A plasma display uses tiny pixel cells of electrically charged gases to produce an image and requires relatively large electrical power to operate.

Flat panel displays having a cathode using a field emission electron source, i.e., a field emission material or field emitter, and a phosphor capable of emitting light upon bombardment by electrons emitted by the field emitter have been proposed. Such displays have the potential for providing the visual display advantages of the conventional cathode ray tube and the depth, weight and power consumption advantages of the other flat panel displays.

Benefits:

- Visual display advantages
- Depth, weight, and power consumption advantages

Applications:

- Flat panel computer and television displays
- Vacuum electronic devices and emission gate amplifiers

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